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Systematic review

Lesbian and bisexual women's gynaecological conditions: a systematic review and exploratory meta-analysis

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This article includes Author Insights, a video abstract available at <https://vimeo.com/rcog/authorinsights14414>.**Background** Little is known about the gynaecological health of lesbian and bisexual (LB) women.**Objectives** To examine differences in incidence and/or prevalence of gynaecological conditions in LB compared with heterosexual women.**Search strategy** The systematic review protocol was prospectively registered (PROSPERO-CRD42015027091) and searches conducted in seven databases.**Selection criteria** Comparative studies published 2000–2015, reporting any benign (non-infectious) and/or malignant gynaecological conditions with no language or setting restrictions.**Data collection and analysis** Inclusions, data extraction and quality assessment were conducted in duplicate. Meta-analyses of condition prevalence rates were conducted where ≥ 3 studies reported results.**Main results** From 567 records, 47 full papers were examined and 11 studies of mixed designs included. No studies directly addressing the question were found. Two chronic pelvic pain studies reported higher rates in bisexual compared with heterosexual women (38.5 versus 28.2% and 18.6 versus 6.4%). Meta-analyses showed no statistically significant differences in

polycystic ovarian syndrome, endometriosis and fibroids. There was a higher rate of cervical cancer in bisexual than heterosexual women [odds ratio (OR) = 1.94; 95% CI 1.46–2.59] but no difference overall (OR = 0.76; 95% CI 0.15–3.92). There was a lower rate of uterine cancer in lesbian than heterosexual women (OR = 0.28; 95% CI 0.11–0.73) and overall (OR = 0.36; 95% CI 0.13–0.97), but no difference in bisexual women (OR = 0.43; 95% CI 0.06–3.07).

Conclusions More bisexual women may experience chronic pelvic pain and cervical cancer than heterosexual women. There is no information on potential confounders. Better evidence is required, preferably monitoring sexual orientation in research using the existing validated measure and fully reporting results.**Keywords** bisexual, cancer, gynaecology, lesbian, pelvic pain, polycystic ovary syndrome, systematic review.**Tweetable abstract** Lesbians have less uterine cancer than heterosexual women; bisexuals have more pelvic pain and cervical cancer.**Linked article** This article is commented on by MJ Eliason, p. 403 in this issue. To view this mini commentary visit <http://dx.doi.org/10.1111/1471-0528.14488>.

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Introduction

Health research in sexual minority women indicates that lesbian and bisexual (LB) women differ from heterosexual women in health risks, health behaviours, and how they experience healthcare.¹ The health risks and health behaviours of LB women are thought to negatively impact their

gynaecological health. These include increased tobacco and alcohol use,^{2,3} higher body mass index (BMI),^{4–6} and reduced uptake of cervical cytology screening.^{7–9} Lesbians are also said to have fewer reproductive behaviours that are associated with protection from various reproductive system cancers than heterosexual women, including use of oral contraceptives, childbirth and breastfeeding.^{10,11}

Furthermore, there is a theory that lesbians have higher levels of testosterone, which could contribute to higher rates of polycystic ovary syndrome (PCOS).^{12–14} Excessive alcohol use and smoking are risk factors for a range of gynaecological disorders, including uterine, breast and ovarian cancers.¹⁵ Increased BMI is a risk factor for conditions such as ovarian cancer and PCOS.^{16,17} Accordingly, journal articles and public health sources have suggested the combination of increased risk factors may lead to LB women having increased rates of gynaecological conditions.^{18–20} Nevertheless, a paucity of research actually measures gynaecological disorder incidence and prevalence in this population.

Conversely, conflicting results regarding reproductive behaviours have been reported. Previous pregnancy and hormonal contraceptive use are common among women who have sex with women (WSW), whether they self-identify as lesbian or not.²¹ Teenage hormonal contraceptive use has been found to be lower in lesbian women, but higher in other sexual minority groups when compared with exclusively heterosexual women.²² Both lesbian and bisexual adolescents have been found to have higher rates of pregnancy.²³ Inconsistent evidence makes it difficult to justify the claim that LB women have fewer reproductive behaviours than heterosexual women. Previous systematic reviews on the health of LB women have considered smoking cessation,²⁴ mental health,²⁵ substance abuse,²⁶ weight,⁴ breast cancer²⁷ and cervical screening.⁷ One narrative review concluded there was little to no published literature on incidence and prevalence of endometrial and cervical cancer in LB women, and that further research was necessary to fill the knowledge gap.²⁸

The aim of this study was to examine the association between LB women's identity or behaviour and their gynaecological health, focusing on the null hypothesis that LB women have the same rates of gynaecological conditions as heterosexual women.

Methods

This systematic review was conducted according to a prospective protocol that was lodged with PROSPERO (CRD42015027091) on 6 October 2015.

Inclusion criteria

Studies were eligible using the following inclusion criteria: (1) population – women self-described as LB, women who described themselves as WSW, or having sex with women and men (WSWM); (2) exposure – women with benign (non-infectious) and malignant gynaecological conditions; (3) comparator – heterosexual women or women self-describing as only having sex with men; (4) study design – any comparative studies including randomised controlled trials, case-control studies, cohort studies, cross-sectional

analyses, experimental studies, or secondary studies with data of interest. Studies had to contain primary data and be peer-reviewed. Only studies reporting after the year 2000 were eligible. There were no restrictions on setting or language. Studies were excluded if: the sexual orientation and behaviour of women were not clear; there was no comparison with heterosexual women; there were no outcomes of interest; or if they were opinions, editorials, conference abstracts or case reports.

Search strategy

Search terms were developed based on the population and exposures sought. MeSH terms and synonyms were used to widen the search. A total of seven databases were used: Ovid Medline; Ovid Embase; Ovid PsycInfo; Web of Science – Science Citation Index; Cochrane; British Nursing Index; CINAHL. Searches were limited to 1 January 2000–22 October 2015 in view of prior piloting. Reference lists of reviews and primary studies were also searched. The authors checked studies on lesbian health used in other projects. A full table of search terms can be found in Appendix S1.

Study selection

After removing duplicates, the remaining papers were assessed independently for relevance first by title, and then by abstract (KR, KYG, CM). All articles were included for full-text assessment if any author considered the abstract relevant or there was uncertainty. Full-text assessment to determine inclusion in the systematic review was carried out by all authors. Any disagreements were resolved by discussion. A standard form was devised prior to data extraction and quality scoring, based on the content of the papers and the aims of the review. Data were independently extracted by two authors (KR, KYG). No authors were contacted about data discrepancies.

Quality assessments

Studies were appraised for selection, performance, attrition and detection biases, and reported in the categories of risk of bias, study design issues and whether the study would be representative of LB in the general population. No formal quality appraisal was carried out as there was no single validated checklist that would be appropriate for all of the studies due to the diverse study designs.

Data analysis

Numbers were converted to *n* (or reverse *n*) and %, using back-calculation and estimates from figures in the published articles when required. *P*-values were calculated when not provided in the paper using Fishers Exact test or Chi-squared test (with Yates' correction) as appropriate. Meta-analysis was conducted using RevMan version 5.3 on the outcomes of gynaecological conditions in LB women,

where three or more studies reported results. Subgroups of LB women in cervical and uterine cancer were conducted.

Results

From 611 records (41 duplicates), 208 abstracts were selected, of which no papers were unavailable and 47 full papers were read. Eleven studies were included [see Figure S1 (PRISMA flow chart) and Table S1 (excluded studies with reasons)].

The 11 studies had a variety of different populations, exposures, study designs, settings and outcomes. All included studies came from high-income countries. No studies were found in any language apart from English. No primary study was found that directly addressed the question.

Study characteristics

These are detailed in Table 1. There were three prospective cohort studies, four retrospective cohort studies, four cross-sectional surveys, and no case-control studies. Settings varied and included reproduction and infertility clinics, online and telephone questionnaires, and large-scale health studies. All were from high-income countries (five USA, two UK, and one each from Canada, Belgium, Denmark and Sweden). Sizes ranged from 31²⁹ to 91 582 participants.¹¹ Recruitment methods varied, and included clinic, convenience and population samples. Data collection included telephone and online surveys, self and medical staff completed questionnaires, a national cancer registry, and medical chart review. Funding sources were wide ranging, though six had no details of funding or were unfunded.

Findings

Table 2 shows that to date there is limited evidence on gynaecological conditions in LB women compared with heterosexuals, and it is particularly sparse for bisexual women. However, there were some interesting findings. Compared with heterosexual women there were significantly more bisexual women with PCOS in one study,²⁹ and lesbians in one study.¹² However, there was no significantly higher rate amongst lesbians in three other studies.^{30–32} There was significantly less chronic pelvic pain for lesbians in one study,³³ but no difference in another.³⁴ There was significantly more chronic pelvic pain for bisexual women in two studies.^{33,34} In one study there were significantly higher rates of cervical cancer in both lesbian and bisexual women, and higher rates of uterine cancer in lesbians but lower rates in bisexual women.³⁵ Another study found lower rates of cervical carcinoma *in situ* in lesbians.³⁶ There was no significant difference in rates of endometriosis and fibroids.^{12,31,37} Two studies reported rates of confounders (alcohol, smoking and BMI) by sexual orientation,^{11, 31} and only one study took a confounder

into account (no difference in BMI between groups when measuring PCOS).³⁰

Exploratory meta-analyses in PCOS, endometriosis and fibroids showed no significant differences overall (in both lesbian and bisexual women; Figure S2). There was a higher rate of cervical cancer in bisexual women than heterosexual women [odds ratio (OR) 1.94; 95% CI 1.46–2.59], but no difference overall (OR 0.76; 95% CI 0.15–3.92) or in lesbians (OR 0.30; 95% CI 0.04–2.08). There was a lower rate of uterine cancer in lesbian women than heterosexual women (OR 0.28; 95% CI 0.11–0.73) and overall (OR 0.36; 95% CI 0.13–0.97), but no difference in bisexual women (OR 0.43; 95% CI 0.06–3.07; Figure 1).

Discussion

Main findings

Despite a paucity of existing primary research, key findings were: higher rates of chronic pelvic pain in bisexual compared with heterosexual women; no statistically significant differences in PCOS, endometriosis and fibroids; a higher rate of cervical cancer in bisexual than heterosexual women but no difference overall; a lower rate of uterine cancer in lesbian than heterosexual women and overall, but no difference in bisexual women.

Strengths and limitations

Strengths include protocol preregistration in the PROSPERO database, no language restriction, careful presentation of numerical results and inclusion of global data from a variety of sources. Rates of gynaecological conditions in LB women were not the primary focus of the majority of included papers, therefore other publications may exist that might have yielded further useful information. There was no formal quality review and we were unable to interrogate confounders (i.e. country, age, ethnicity, class, education, BMI, actual sexual behaviours). This makes it difficult to ascertain whether differences in reported rates are truly due to sexual orientation or confounding factors. Furthermore, the lack of consistent definitions of sexual orientation (Table 1) poses a challenge in discerning the differences in rates of gynaecological disorders between LB and heterosexual women. Different aspects of sexual orientation, including behaviour, identity and attractions, may confound each other, making this a difficult research area. The meta-analyses should be approached with caution due to the heterogeneity of studies included. Nevertheless, there is sufficient consistent information to draw some clinical conclusions with generalisability.

Interpretation in light of other evidence

There have been no previous systematic reviews of gynaecological disorders in LB women.

Table 1. Characteristics of the included studies

Author (year)	Exposure	Population, setting, country	Definition of sexual orientation/behaviour	Comparison	Recruitment, data collection	Outcomes of interest	Study design, funding
Agrawal et al. (2004) ¹²	Women undergoing ovarian stimulation with or without IUI treatment between 2001 and 2003.	254 lesbian women. No bisexuals. Private sector assisted reproduction clinics (London Women's Clinic or Hallam Medical Centre). UK.	Medical questionnaire and 3 separate assessments by a clinician, nurse, and a clinical psychologist and counsellor. Lesbian women pre-assigned their sexual partner orientation themselves.	364 heterosexual women.	Clinic sample. Women attending either clinic for treatment between November 2001 and January 2003. Data collected in the clinics – medical questionnaire, pelvic ultrasound scan, clinical examination, blood samples.	PCOS Endometriosis. Fibroids.	Cohort, prospective. No details of funding given other than support was provided by HCA Laboratories in London in the form of hormone profiling on women in the study.
Blair et al. (2015) ³³	Women <45 years old responding to an online survey about sexual functioning and relationships.	172 lesbian women and 309 bisexual women; online questionnaire; Ontario, Canada	Participants asked to indicate their sexual identity (lesbian, gay, bisexual, straight) as well as the nature of their current relationship (same sex, mixed sex, or single).	358 heterosexual women.	Convenience sample. Participants were recruited using ads on Facebook, word of mouth, postings on online websites that advertise online studies, and flyers posted around the university to participate in an online survey about sexual experiences. The survey asked about sexual functioning and relationship and self-reporting genital (genital, vulvar and pelvic) pain.	Chronic pelvic pain.	Cross-sectional. Funding from the Lesbian Health Fund of GLMA.
Boehmer et al. (2011) ³⁵	Women who took part in the California Health Interview Survey from 2001, 2003 and 2005 self-reporting cancer diagnosis.	918 lesbians and 1116 bisexual women; Telephone survey; California, USA	Respondents asked about sexual identity (heterosexual/lesbian/ bisexual).	69,078 heterosexual women.	Population sample. Women participating in the California Health Interview Survey from 2001, 2003 and 2005. This is a geographically stratified random-digit-dial sample of households, surveying 1 adult from each. Cancer prevalence estimates were derived from the survey question 'Has a physician ever told you that you had a cancer of any kind?'. Adults who confirmed were asked about type of cancer.	Cervical cancer. Uterine cancer.	Cohort, retrospective. Funding from the American Cancer Society grant # RSGT-06-135-01-CPPB to focus on sexual orientation disparities in the adjustment of breast cancer survivors. The analyses presented were conducted in this context.
De Sutter et al. (2008) ³⁰	Women undergoing artificial insemination with donor spermatozoa (AID).	174 lesbian women. No bisexuals. Infertility Centre, University Hospital Ghent. Belgium.	Extensive psychological counselling confirmed sexual orientation plus presence of partner of the same or different gender.	200 heterosexual women.	Clinic sample. Participants considered for inclusion when consulting for AID between January 2002 and June 2006. Data collected retrospectively from patient files.	PCOS. Oligo-amenorrhoea.	Cohort, retrospective. No details of funding other than 'no conflict of interest'.
	Women undergoing laparoscopic investigations		Referred women either single or in a lesbian relationship.	27 single heterosexual women.	Clinic sample. Patients included in study if they had attended		Cohort, retrospective. No details of funding given.

Table 1. (Continued)

Author (year)	Exposure	Population, setting, country	Definition of sexual orientation/behaviour	Comparison	Recruitment, data collection	Outcomes of interest	Study design, funding
Ferrara et al. (2000) ³⁷	during IUI-DI treatment with frozen spermatozoa.	8 lesbian women. No bisexuals. Bridge Centre, London, UK.			the clinic between 1993 and 1997. Data collected from patient records to identify treatment outcome, age, and diagnostic and treatment variables.	Endometriosis. Fibroids. Endometrial polyps.	
Frisch et al. (2003) ³⁶	Women who had one or more records of registered homosexual partnership between 1989 and 1997 followed up using the Danish Cancer Registry.	1614 lesbians registered for marriage-like homosexual partnership. No bisexuals. Denmark.	Women were in homosexual marriage-like partnerships.	Observed cancers compared with numbers expected based on cancer incidence rates for the entire Danish population (relative risks).	Population sample. Women included who had one or more records of registered homosexual partnership on the Civil Registration System between 1989 and 1997. Identity-secure data linkage to Danish Cancer Registry to assess cancer outcomes in cohort.	Ovarian cancer. Uterine cancer. Uterine cervix (cervical) cancer – <i>in situ</i> and invasive.	Cohort, retrospective. Supported by the Psychosocial Research Foundation of the Danish Cancer Society (grant 97-225-57).
Manlove et al. (2008) ²⁹	Women self-reporting PCOS and controls without PCOS.	4 bisexual women. No lesbians; 30 heterosexual women. Anonymous online questionnaire. Nevada, USA	Self-identification as heterosexual, bisexual or homosexual, and whether their orientation had ever changed.	27 heterosexual controls without PCOS.	Volunteers – women responding to a script (advert) posted on PCOS-related Internet sites and by word-of-mouth. Self-identification as previously diagnosed with PCOS by their physician (PCOS sites), or never having been diagnosed with PCOS by their physician (word of mouth from cases).	PCOS.	Cross-sectional. No details of funding given.
Nordqvist et al. (2014) ³¹	Heterosexual and lesbian couples undergoing sperm donation treatment in Sweden between 2005 and 2008.	168 lesbian couples. No bisexuals. Sperm donation clinics. Sweden.	Heterosexual and lesbian couples.	124 heterosexual couples.	Clinic sample. Heterosexual and lesbian couples undergoing sperm donation treatment between 2005 and 2008, all clinics offering sperm donation in Sweden participated.	Endometriosis. Operation of ovarian cyst. PCOS. Fibroids. Uterine polyp operation.	Cross-sectional. Granted by the Stiftelsen Famijplaneringsfonden i Uppsala; the Swedish Research Council for Health, Working Life and Welfare; and the Marianna and Marcus Wallenberg Foundation Open Access publication funded by Uppsala-Örebro Regional Research Council.
Roberts et al. (2013) ³⁴	Young adults in the US cohort; Growing Up Today Study 2007.	196 gay men and lesbians. 172 bisexual men and women; USA. (Number of lesbians and bisexual women not given. Total proportion of 3641 men and 6143 women used to estimate these numbers)	Assessed with two questions about lifetime sexual contact and current feelings. (People who reported 'completely Heterosexual' feelings and same-sex sexual contact were categorised as 'heterosexual with same-sex contact').	7828 men and women categorised: heterosexuals with no lifetime same sex contact; heterosexual, same-sex sexual contact; mostly heterosexual.	Population sample. 2007 wave of Growing Up Today Study – US longitudinal cohort of 16 882 children of women participating in the Nurses' Health Study II.	Functional (chronic) pelvic pain.	Cohort, prospective. Funded by grants HD057368 and HD049889 from the National Institutes of Health.

Table 1. (Continued)

Author (year)	Exposure	Population, setting, country	Definition of sexual orientation/behaviour	Comparison	Recruitment, data collection	Outcomes of interest	Study design, funding
Smith et al. (2011) ³²	Women aged 35–45 years participating in The Epidemiological Study of Health Risk in Women (ESTHER) Project, 2003–2006.	114 self-identified lesbian women participating in the ESTHER project. No bisexuals. Clinic at University of Pittsburgh, Pennsylvania, USA.	Self-identification with confirmatory questions regarding sexual behaviour and attraction.	97 self-identified heterosexual women participating in the ESTHER project.	Convenience sample. After completion of the ESTHER study, consenting participants were mailed a PCOS study invitation. Data used were obtained from self-administered questionnaires, clinical measurements and blood assays collected during the initial ESTHER study.	PCOS, Oligo-amenorrhoea.	Cohort, prospective. ESTHER funded by National Heart, Lung and Blood Institute (Grant 5R01HL067052). Lesbian Health Fund and Lambda Foundation supported PCOS study. Author supported by Agency for Healthcare Research and Quality.
Valanis et al. (2000) ¹¹	Postmenopausal women aged 50–79 years who participated in the Women's Health Initiative (WHI) Study, based at one of 40 clinical centres across the US.	264 'lifetime' lesbians, 309 'adult' lesbians and 740 bisexuals. WHI study. USA.	Questionnaire measuring sex of lifetime and recent sexual partners. Grouped into heterosexual, bisexual, lifetime lesbian (sex with only women ever), adult lesbian (sex only with women after age 45 years) or never had adult sex.	90,578 heterosexual women.	Convenience sample. Recruitment via adverts/unsolicited mailings. Potential participants contacted one of 40 clinical centres across the US, and underwent an initial screening via telephone. Following further eligibility testing, women were randomised into one of 3 trials. Those ineligible for any trial participated in an observational study. Data collected via a variety of questionnaires developed by a team of trial investigators and staff.	Endometrial cancer. Cervical cancer.	Cross-sectional survey (3 randomised clinical trials and 1 longitudinal observational study). No details of funding given.

IUI, intra-uterine insemination; PCOS, polycystic ovary syndrome.

Table 2. Numerical results from included studies

Author (year)	Outcome measure	Quantitative results			
		Lesbian % (n/N)	Bisexual % (n/N)	Comparison group % (n/N)	Statistics
Agrawal et al. (2004) ¹²	PCOS	38% (97/254)*	Not measured	Heterosexual women 14% (51/364)*	P < 0.0001 Significant
	Endometriosis	3.65% (9/254)*	Not measured	Heterosexual women 3.39% (12/364)*	P > 0.5 NS
	Fibroids	5.6% (14/254)*	Not measured	Heterosexual women 6.8% (25/364-)	P > 0.5 NS
Blair et al. (2015) ³³	Pelvic pain	23.3% (40/172)	38.5% (119/309)	28.2% (101/358)	P = 0.001 Significant
Boehmer et al. (2011) ³⁵	Cervical cancer	1.7% (16/9184)**	3.0% (33/1116)*	1.4% (991/69078)**	P < 0.0001 Significant
	Uterine cancer	1.2% (11/9184)**	0.1% (1/1116)*	0.7% 457/69078)**	P < 0.05 Significant
De Sutter et al. (2008) ³⁰	PCOS	8.0% (12/150)	Not measured	8.7% (14/161)	NS
	Oligo-amenorrhoea	11.5% (20/174)	Not measured	12.1% (24/199)	NS
Ferrara et al. (2000) ³⁷	Endometriosis	37.5% (3/8)	Not measured	Single heterosexual women 29.6% (8/27)	P > 0.05 NS
	Fibroids	0% (0/8)	Not measured	Single heterosexual women 11.1% (3/27)	P > 0.05 NS
	Endometrial polyp	0% (0/8)	Not measured	Single heterosexual women 7.4% (2/27)	P > 0.05 NS
Frisch et al. (2003) ³⁶	Ovarian cancer	(0.06%)* Observed 1/1614	Not measured	Compared to Denmark population, not given	RR 0.9 (95% CI 0.0–4.8) NS
	Endometrial cancer	(0.19%)* Observed 3/1614	Not measured	Compared to Denmark population, not given	RR 3.4 (95% CI 0.7–10.0) NS
	Cervical cancer: invasive	(0.19%)* Observed 3/1614	Not measured	Compared to Denmark population, not given	RR 1.8 (95% CI 0.4–5.2) NS
	in situ	(0.06%)* Observed 1/1614	Not measured	Compared to Denmark population, not given	RR 0.2 (95% CI 0.0–0.97) (< expected 5.8) ****
Manlove et al. (2008) ²⁹	PCOS	Not measured	100% (4/4)	49.2% heterosexual (30/61)	P < 0.0146***** (Fisher's Exact test)
	Endometriosis	4.2% (7/165)	Not measured	1.8% (2/111)	P = 0.32 NS

Table 2. (Continued)

Author (year)	Outcome measure	Quantitative results			
		Lesbian % (n/N)	Bisexual % (n/N)	Comparison group % (n/N)	Statistics
Nordqvist et al. (2014) ³¹	Ovarian cyst operation	2.4% (4/165)	Not measured	0.9% (1/111)	<i>P</i> = 0.42 NS
	PCOS	7.3% (12/165)	Not measured	7.2% (8/111)	<i>P</i> = 1.00 NS
	Fibroids	7.3% (12/165)	Not measured	3.6% (4/111)	<i>P</i> = 0.20 NS
	Uterine polyp operation	1.8% (3/165)	Not measured	7.2% (8/111)	<i>P</i> = 0.03
Roberts et al. (2013) ³⁴	Pelvic pain	8.4% (16/123) ^{***}	18.6% (32/108) ^{****,*****}	Heterosexual 6.4% (501/4915) ^{***} Heterosexual, same-sex sexual contact 17.2% (29/107) [*] ^{*****} Mostly heterosexual 10.4% (147/890) ^{***,*****}	****<i>P</i> < 0.001 compared with heterosexual men and women with no lifetime same-sex sexual contact.
Smith et al. (2011) ³²	PCOS	7.9% (9/114)	Not measured	4.1% (4/97)	<i>P</i> = 0.256 NS
Valanis et al. (2000) ¹¹	Oligoamenorrhoea	3.6% (4/114)	Not measured	5.4% (5/97)	<i>P</i> = 0.735 NS
	Endometrial cancer	'Lifetime lesbian'	1.6% (12/740) [*]	Heterosexual 1.8% (1630/90578) [*]	All <i>P</i> = NS ^{****} (Chi square with Yates Correction)
		0.0% (0/264) [*]			
		'Adult lesbian'			
	Cervical cancer	1.5% (5/309) [*]		Heterosexual 1.3% (1178/90578) [*]	Adult lesbian RR 1.078 Lifetime lesbian RR 1.75
		'Lifetime lesbian'	2.1% (16/740) [*]		
		2.2% (6/264) [*]			

NS, not significant; PCOS, polycystic ovary syndrome; RR, relative risk.

^{*}Back calculations of *n* using weighted denominator.

^{**}Back calculation by authors using weighted prevalence estimates given in paper.

^{***}Percentages calculated by authors.

^{****}As given in the paper, comparison with expected rates not given.

^{*****}Statistics calculated with QuickCalcs online calculator (www.graphpad.com/quickcalcs/contingency1).

significant differences in bold.

The lack of a significant difference in rates of PCOS between heterosexual and LB women contrasts with Agrawal et al.¹² who found significantly raised prevalence of PCOS in lesbians (although the researchers were not blind to sexual orientation), and information published through public health websites for patients, advising lesbians they could have higher rates of PCOS than heterosexuals.²⁰

Chronic pelvic pain is typically associated with endometriosis and infection.³⁸ There were no differences in endometriosis rates in lesbians, and no studies examining endometriosis in bisexual women were found. Sexually transmitted diseases were out of scope of this review, and reported differences in bacterial vaginosis and the vaginal microbiome deserve further exploration.^{39–41} Both studies investigating

chronic pelvic pain examined pain not attributed to a medical cause, i.e. functional. The higher rate of functional pelvic pain among bisexuals could be linked to lifestyle factors. Sexual minorities are exposed to more adverse childhood experiences than heterosexuals, including child abuse, housing adversity and intimate partner violence.⁴² Roberts et al.³⁴ suggested that dysregulation of the hypothalamic–pituitary–adrenal system and related inflammatory processes resulting from abuse or violence victimisation may predispose individuals to experience functional pain.

The higher rate of cervical cancer in bisexuals could plausibly be related to higher exposure to risk factors, including smoking and unprotected sex with men (especially in adolescence), and lower attendance for screening.⁴³ The lower rate of uterine cancer in lesbian women is

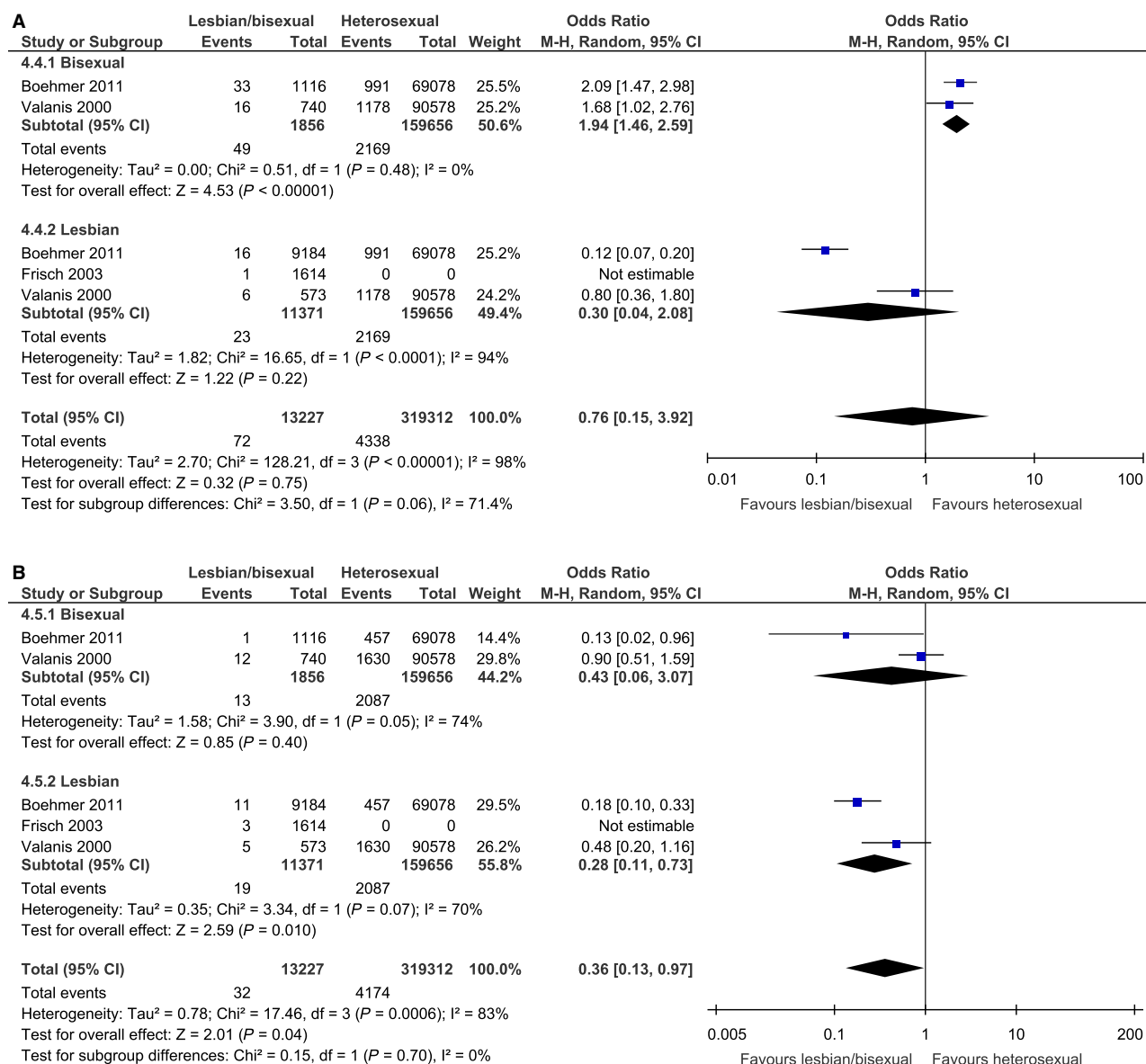


Figure 1. Meta-analyses of rates of gynaecological cancers in lesbian and bisexual (LB) women compared with heterosexual women. (A) Meta-analysis of rates of cervical cancer. (B) Meta-analysis of rates of uterine cancer. The 'events' heading is the number of patients with that condition; 'total' is the number of patients in that group; and the 'weight' is the relative impact of each study on the meta-analysis result. 'Favours LB' means that if the point estimate of the meta-analysis effect size is in that side of the plot, fewer LB women have the condition than heterosexuals and vice versa.

surprising due to the lower parity and higher BMI when compared with heterosexual women,^{4,23} which are both risk factors for uterine cancer.⁴⁴ These risks may be offset by the higher rates of smoking among lesbian women,³ which is a protective factor.⁴⁵ Oestrogen excess is also a risk factor for uterine cancer. There is little evidence on the comparison of oestrogen levels between LB and heterosexual women. One small study found no difference in oestrogen levels between lesbians and bisexual women.⁴⁶ Another study investigating PCOS found no difference in oestrogen levels between lesbians and heterosexuals with normal

ovaries.¹² An old review also found no difference in oestrogens in lesbians compared with heterosexual women.¹³ It is unclear whether the lower rate of uterine cancer is due to a combination of differing risk factors and protective factors, but further large-scale research is necessary to confirm this correlation.

Conclusion

Too little is known about LB women, and new comparative studies would be valuable to ensure conclusions, for

instance regarding cancer incidences, are based on solid evidence rather than a negative hypothesis. A key message is that LB women's possible problems and difficulties have to be handled with care. For the majority of gynaecological conditions, there are no differences between LB and heterosexual women. Clinicians may not know or take into account their patients' sexuality when treating them for gynaecological disorders, and should be open and non-stigmatising to obtain this information. Existing notions about PCOS must be undone, and clinicians should not treat sexuality as an association. Clinicians should be aware of higher rates of pelvic pain and cervical cancer in bisexual women. Current sexual identity or behaviour is not a correct indicator of risk for cervical cancer, as women who currently identify as heterosexual may have prior bisexual experience. Similarly, parity does not indicate current sexual identity or behaviour as lesbians may have children.^{21,23} Furthermore, fertility-limiting gynaecological diseases, such as endometriosis and fibroids, need to be acknowledged and addressed regardless of sexual orientation and providers' perceived likelihood of future pregnancies. Clinicians should provide appropriate information to all women, and not make assumptions about their patients' sexuality in any sexual or reproductive health setting.

Heterosexuality should not be assumed in gynaecology as many LB women would prefer to disclose their sexuality but feel unable to, silenced by this assumption.⁴⁷ Conversely, they may be reticent to 'come out' to their healthcare professional for fear of adverse reactions. It may be that more women do not disclose due to safety issues and the uncertainty about how they will be treated. Past experiences of homophobia, heterosexism and discrimination can directly affect patterns of healthcare seeking, leading to avoidance of routine screening, and reluctance to seek help and advice in future. Healthcare providers should ensure they are aware of potential stigmatisation and issues of cultural competency with sexual minority women, ensuring equitable access and optimal healthcare for patients. Openness and sensitivity allows for an ease in communication and the formation of a better doctor–patient relationship. Half of LB women in a large UK community survey have not disclosed their sexual orientation to their primary healthcare provider.⁴⁸ It is important to remember that not all LB women will want to disclose.⁴⁹

The paucity of primary studies may relate to a lack of interest, lack of funding, or stigmatisation. These exploratory results need confirmation with high-quality large-scale studies into LB women's gynaecological health. Whilst identity and behaviour are overlapping categories, they must be distinguished in future research. An important implication is that sexual orientation should be routinely recorded as part of data collection in cohort studies,

alongside medical records, to allow more large-scale interpretation of disease patterns (and potential confounders) as previous authors have also concluded.^{28,50} More work is required in developing countries, although matters such as routine recording may be problematic due to stigma or illegality of homosexuality. Research has suggested that a relatively large proportion of GPs have difficulties with discussing sexual identity with patients.^{51–53} If this is also true with secondary care and gynaecology staff, work is required to help practitioners be more confident and comfortable with their LB patients. How best to achieve this is unclear, and studies exploring methods of training health staff should be developed.

Disclosure of interests

None declared. Completed disclosure of interests form available to view online as supporting information.

Contribution to authorship

The authors were involved as follows: KR, SB, CM conception and design; KR, KYG, SB, CM execution, analysis, drafting manuscript and critical discussion; all were responsible for revision and final approval of the manuscript. All authors had full access to all of the data (including statistical reports and tables) in the study, and can take responsibility for the integrity of the data and the accuracy of the data analysis.

Details of ethics approval

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Supporting Information

Additional Supporting Information may be found in the online version of this article:

Figure S1. PRISMA flow diagram.

Figure S2. Meta-analyses of rates of gynaecological conditions in lesbian/bisexual women compared to heterosexual women.

Table S1. Full Text Papers Excluded.

Appendix S1. List of Search Terms.

Video S1. Author Insights. ■

References

- 1 Fish J, Bewley S. Lesbian and bisexual women's health issues. In: Shaw RW, Luesley DM, Monga A, editors. *Gynaecology*, 4th edn. Oxford: Elsevier; 2010. pp. 1009–16.
- 2 Fredriksen-Goldsen KI, Kim HJ, Barkan SE, Muraco A, Hoy-Ellis CP. Health disparities among lesbian, gay, and bisexual older adults: results from a population-based study. *Am J Public Health* 2013;103:1802–9.
- 3 Rosario M, Corliss HL, Everett BG, Reisner SL, Austin SB, Buchting FO, et al. Sexual orientation disparities in cancer-related risk behaviors of tobacco, alcohol, sexual behaviors, and diet and physical activity: pooled Youth Risk Behavior Surveys. *Am J Public Health* 2014;104:245–54.
- 4 Eliason MJ, Ingraham N, Fogel SC, McElroy JA, Lorvick J, Mauery DR, et al. A systematic review of the literature on weight in sexual minority women. *Women's Health Issues* 2015;25:162–75.
- 5 Jun HJ, Corliss HL, Nichols LP, Pazaris MJ, Spiegelman D, Austin SB. Adult body mass index trajectories and sexual orientation: the Nurses' Health Study II. *Am J Prev Med* 2012;42:348–54.
- 6 Katz-Wise SL, Blood EA, Milliren CE, Calzo JP, Richmond TK, Gooding HC, et al. Sexual orientation disparities in BMI among US adolescents and young adults in three race/ethnicity groups. *J Obesity* 2014;2014:1–8.
- 7 Fish J. Cervical screening in lesbian and bisexual women: a review of the worldwide literature using systematic methods. *NHS Cerv Screen Prog* 2009; <http://www.glnv.org.au/files/screening-lesbians-bisexual-women.pdf>.
- 8 Tracy JK, Schluterman NH, Greenberg DR. Understanding cervical cancer screening among lesbians: a national survey. *BMC Public Health* 2013;13:442.
- 9 Tracy JK, Lydecker AD, Ireland L. Barriers to cervical cancer screening among lesbians. *J Women's Health* 2010;19:229–37.
- 10 Dibble SL, Roberts SA, Robertson PA, Paul SM. Risk factors for ovarian cancer: lesbian and heterosexual women. *Oncol Nurs Forum* 2002;29:E1–7.
- 11 Valanis BG, Bowen DJ, Bassford T, Whitlock E, Charney P, Carter RA. Sexual orientation and health: comparisons in the women's health initiative sample. *Arch Fam Med* 2000;9:843.
- 12 Agrawal R, Sharma S, Bekir J, Conway G, Bailey J, Balen AH, et al. Prevalence of polycystic ovaries and polycystic ovary syndrome in lesbian women compared with heterosexual women. *Fertil Steril* 2004;82:1352–7.
- 13 Meyer-Bahlburg H. Sex hormones and female homosexuality: a critical examination. *Arch Sexual Behav* 1979;8:101–19.
- 14 Pearcey SM, Docherty KJ, Dabbs JM. Testosterone and sex role identification in lesbian couples. *Physiol Behav* 1996;60:1033–5.
- 15 Rieck G, Fiander A. The effect of lifestyle factors on gynaecological cancer. *Best Pract Res Clin Obstet Gynaecol* 2006;20:227–51.
- 16 Barber TM, McCarthy MI, Wass JA, Franks S. Obesity and polycystic ovary syndrome. *Clin Endocrinol* 2006;65:137–45.
- 17 Calle EE, Rodriguez C, Walker-Thurmond K, Thun MJ. Overweight, obesity, and mortality from cancer in a prospectively studied cohort of US adults. *New Engl J Med* 2003;348:1625–38.
- 18 Association of Reproductive Health Professionals. Optimizing Reproductive Health Care of Women Who Have Sex with Women. 2008 [online] [www.arhp.org/Publications-and-Resources/Clinical-Fact-Sheets/WSW]. Accessed 21 April 2016.
- 19 Cochran SD, Mays VM, Bowen D, Gage S, Bybee D, Roberts SJ, et al. Cancer-related risk indicators and preventive screening behaviors among lesbians and bisexual women. *Am J Public Health* 2001;91:591.
- 20 Office on Women's Health, US Department of Health and Services. Lesbian and bisexual health fact sheet. 2012 [online] [womenshealth.gov/publications/our-publications/fact-sheet/lesbian-bisexual-health.html] Accessed 25 April 2016.
- 21 Marrazzo JM, Stine K. Reproductive health history of lesbians: implications for care. *Am J Obstet Gynecol* 2004;190:1298–304.
- 22 Charlton BM, Corliss HL, Missmer SA, Rosario M, Spiegelman D, Austin SB. Sexual orientation differences in teen pregnancy and hormonal contraceptive use: an examination across 2 generations. *Am J Obstet Gynecol* 2013;209:204–e1.
- 23 Hodson K, Meads C, Bewley S. Lesbian and bisexual women's likelihood of becoming pregnant: a systematic review (manuscript under review by BJOG).
- 24 Lee JG, Matthews AK, McCullen CA, Melvin CL. Promotion of tobacco use cessation for lesbian, gay, bisexual, and transgender people: a systematic review. *Am J Prevent Med* 2014;47:823–31.
- 25 King M, Semlyen J, Tai SS, Killaspy H, Osborn D, Popelyuk D, et al. A systematic review of mental disorder, suicide, and deliberate self-harm in lesbian, gay and bisexual people. *BMC Psychiat* 2008;8:1.
- 26 Marshal MP, Friedman MS, Stall R, King KM, Miles J, Gold MA, et al. Sexual orientation and adolescent substance use: a meta-analysis and methodological review. *Addiction* 2008;103:546–56.
- 27 Meads C, Moore D. Breast cancer in lesbians and bisexual women: systematic review of incidence, prevalence and risk studies. *BMC Public Health* 2013;13:1.
- 28 Quinn GP, Sanchez JA, Sutton SK, Vadaparampil ST, Nguyen GT, Green BL, et al. Cancer and lesbian, gay, bisexual, transgender/transsexual, and queer/questioning (LGBTQ) populations. *CA: Cancer J Clin* 2015;65:384–400.
- 29 Manlove HA, Guillermo C, Gray PB. Do women with polycystic ovary syndrome (PCOS) report differences in sex-typed behavior as children and adolescents?: results of a pilot study. *Annals Hum Biol* 2008;35:584–95.
- 30 De Sutter P, Dutré TI, Meerschaut FV, Stuyver IS, Van Maele GE, Dhont MA. PCOS in lesbian and heterosexual women treated with artificial donor insemination. *Reprod Biomed Online* 2008;17:398–402.
- 31 Nordqvist S, Sydsjö G, Lampic C, Åkerud H, Elenis E, Svanberg AS. Sexual orientation of women does not affect outcome of fertility treatment with donated sperm. *Hum Reprod* 2014;29:704–11.
- 32 Smith HA, Markovic N, Matthews AK, Danielson ME, Kalro BN, Youk AO, et al. A comparison of polycystic ovary syndrome and related factors between lesbian and heterosexual women. *Women's Health Issues* 2011;21:191–8.
- 33 Blair KL, Pukall CF, Smith KB, Cappell J. Differential associations of communication and love in heterosexual, lesbian, and bisexual women's perceptions and experiences of chronic vulvar and pelvic pain. *J Sex Marital Ther* 2015;41:498–524.
- 34 Roberts AL, Rosario M, Corliss HL, Wypij D, Lightdale JR, Austin SB. Sexual orientation and functional pain in US young adults: the mediating role of childhood abuse. *PLoS ONE* 2013;8:e54702.
- 35 Boehmer U, Miao X, Ozonoff A. Cancer survivorship and sexual orientation. *Cancer* 2011;117:3796–804.
- 36 Frisch M, Smith E, Grulich A, Johansen C. Cancer in a population-based cohort of men and women in registered homosexual partnerships. *Am J Epidemiol* 2003;157:966–72.
- 37 Ferrara I, Balet R, Grudzinkas JG. Intrauterine donor insemination in single women and lesbian couples: a comparative study of pregnancy rates. *Hum Reprod* 2000;15:621–5.
- 38 Royal College of Obstetricians and Gynaecologists. The Initial Management of Chronic Pelvic Pain. Green-top Guideline No. 41. 2012 [//www.rcog.org.uk/en/guidelines-research-services/guidelines/gtg41/] Accessed 23 April 2016.

- 39 Bradshaw CS, Walker SM, Vodstrcil LA, Bilardi JE, Law M, Hocking JS, et al. The influence of behaviours and relationships on the vaginal microbiota of women and their female partners: the WOW Health Study. *J Infect Dis* 2014;209:1562–72.
- 40 Forcey DS, Vodstrcil LA, Hocking JS, Fairley CK, Law M, McNair RP, et al. Factors associated with bacterial vaginosis among women who have sex with women: a systematic review. *PLoS ONE* 2015;10:e014190.
- 41 Muzny CA, Sunesara IR, Austin EL, Mena LA, Schwebke JR. Bacterial vaginosis among African American women who have sex with women. *Sexually Trans Dis* 2013;40:751–5.
- 42 McLaughlin KA, Hatzenbuehler ML, Xuan Z, Conron KJ. Disproportionate exposure to early-life adversity and sexual orientation disparities in psychiatric morbidity. *Child Abuse Negl* 2012;36:645–55.
- 43 Barker M, Richards C, Jones R, Bowes-Catton H, Plowman T, Yockney J, et al. The bisexuality report. Milton Keynes: The Open University 2012 [online]. [<https://bisexualresearch.files.wordpress.com/2011/08/the-bisexualityreport.pdf>] Accessed 14 April 2016.
- 44 Cote ML, Alhajj T, Ruterbusch JJ, Bernstein L, Brinton LA, Blot WJ, et al. Risk factors for endometrial cancer in black and white women: a pooled analysis from the epidemiology of endometrial cancer consortium (E2C2). *Cancer Causes Control* 2015;26:287–96.
- 45 Zhou B, Yang L, Sun Q, Cong R, Gu H, Tang N, et al. Cigarette smoking and the risk of endometrial cancer: a meta-analysis. *Am J Med* 2008;121:501–8.
- 46 Diamond L, Wallen K. Sexual minority women's sexual motivation around the time of ovulation. *Arch Sexual Behav* 2011;40:237–46.
- 47 Roberts SJ. Lesbian health research: a review and recommendations for future research. *Health Care Women Int* 2001;22:537–52.
- 48 Hunt R, Fish J. *Prescription for Change: Lesbian and Bisexual Women's Health Check*. London: Stonewall, 2008.
- 49 McNair RP. Lesbian health inequalities: a cultural minority issue for health professionals. *Med J Aust* 2003;178:643–5.
- 50 Haggard-Johnson G, Taibjee R, Semlyen J, Fitchie I, Fish J, Meads C, et al. Sexual orientation identity in relation to smoking history and alcohol use at age 18/19: cross-sectional associations from the Longitudinal Study of Young People in England (LSYPE). *BMJ Open* 2013;3:e002810.
- 51 King M. Attitudes of therapists and other health professionals towards their LGB patients. *Int Rev Psychiat* 2015;27:396–404.
- 52 Westerstahl A, Segesten K, Bjorkelund C. GPs and lesbian women in the consultation: issues of awareness and knowledge. *Scand J Primary Health Care* 2002;20:203–6.
- 53 Hinchliffe S, Gott M, Galena E. 'I daresay I might find it embarrassing' – general practitioners perspectives on discussing sexual health issues with lesbian and gay patients. *Health Social Care Commun* 2004;13:345–53.